

In the Specification:

Page 2, line ¹⁰~~13~~ (para 0007):

B1 Typical wireless communication systems do not have the capability to automatically identify and adapt parameter settings to such changes. Environmental changes that often require parameters setting adjustments include the construction of structures in the coverage area, such as a building in an outdoor cellular system or a added walls in an indoor system, or the installation of another wireless communication system in close proximity to the current system. Such changes could degrade system performance and often require an installer to perform computer modeling of the coverage area again to determine the proper parameters settings.

Page 3, line ¹⁶~~19~~ (para 0012)

B2 In accordance with the invention, it is possible for the wireless terminals associated with subscribers located within the coverage area to provide the measurements for the path loss-related characteristic. Such a characteristic can be path loss determined by the wireless terminals measuring ~~received signal strength (RSS)~~ RSS of signals transmitted at known power levels by the system's base stations. Since the base stations are transmitting at known power levels, the path losses between the base stations and the respective locations of the measuring wireless terminals can be determined based on the differences between the known transmission powers and the RSS measurements. The determined path losses are used to form the signal propagation characterization which can be used to predict the signal strength received at locations of the measuring wireless terminals based on a corresponding increase or decrease in base station transmission power. Moreover, the individual and cumulative interference characteristics of signals transmitted on the same or adjacent communication channels between the respective base stations and the locations of the measuring wireless terminals can also be obtained from such a characterization.

Page 5, line ²⁵~~28~~ (para 0022):

B3 The signal propagation characterization used to determine the parameter settings can be in the form of a table, two or multi-dimension matrix or other

B3 mathematical expression of a plurality of the path loss-related characteristics that facilitates prediction of, for example, received signal strength or interference at locations throughout the coverage area. Path loss-related characteristic refers to a measurable characteristic that is partially or fully based on path loss and includes, for example, path loss, bit error rate, word error rate and frame error rate. Path loss refers to the reduction in power of a signal transmitted between two locations. Coverage area refers to the geographic area in which a wireless terminal can communicate with the base stations of the system without substantial interruption. In determining the signal propagation characterization, the ~~path—loss—related~~loss-related characteristic measurements can be taken over an extended period of time during operation of the system. Path loss, an exemplary path loss-related characteristic, can be determined from the difference between known transmission powers of a plurality of the system's base stations and the corresponding received signal strengths measured by a plurality of wireless terminals at different locations in the coverage area.

Page 6, lines 9-11 (para 0024)

B4 The MSC 25 is responsible for routing calls between wireless terminals 40 and the respective base stations 5-15 and to the PSTN 35. For small coverage area applications, suitable MSC's and base stations include, for example, small MSC devices manufactured by Celcore and microcells produced by Lucent Technologies, Inc., respectively. For larger coverage area applications, exemplary MSC and base stations include those manufactured by wireless infrastructure manufacturers such as Lucent Technologies, Inc. The method of wireless communication is not critical to practicing the invention and can be, for example, digital communications techniques including code division multiple access (CDMA) schemes or ~~time—division—multiple access—(TDMA)~~TDMA schemes such as a TDMA scheme in accordance with the ~~Telecommunication Industry Association Interim Standard 136 (IS-136)~~TIA IS-136 standard as well as conventional analog techniques.

Page 6, line 24 (para 0025):

B5 Each of the base stations 5, 10 and 15 provides communications to the wireless terminals 40 in respective service areas 105, 110 and 115 (105-115). The sizes of the exemplary service areas 105-115 are different due to the respective transmission powers of the base stations 5-15 and the environment in which the base stations 5-15 are operating. Overlap regions (not shown) exist between the service areas 105-115 to enable hand-offs between adjacent base stations to provide substantially uninterrupted communications of a wireless terminal as it travels across service area boundaries. Suitable overlap regions include those used in conventional wireless systems and have not been shown for ease of illustration.

Page 6, lines 34 and 36 (para 0027):

B6 An exemplary method for determining system organization parameters for the system 1 of FIGS. 1 and 2 in accordance with the invention, will be described with respect to path loss based on RSS measurements taken by the wireless terminals 40 of signals transmitted at a known power by the base stations 5-15. Such path loss-related characteristic measurements are for illustration purposes only, and it is alternatively possible in accordance with the invention, to employ other path loss-related characteristics measurements, including bit, word or frame error rates, or for such measurements to be taken by the base stations 5-15 based on signals transmitted by the wireless terminals 40.

Page 7, lines 14-17 (para 0028):

B7 According to the exemplary method, RSS measurement data is collected by wireless terminals 40 based on signals transmitted by the respective base stations 5-15. Such collected data can then be transmitted to at least one of the base stations 5-15. It is possible for a wireless terminal 40 to transmit data regarding a RSS measurement to the corresponding base station that provides service to that terminal's location. The RSS data can be transmitted by the wireless terminals 40 at times, for example, when the terminal is activated and registers with the base station, responds to a page, originates a call, and/or intermittently during a call or otherwise. Several

B7
current digital communication standards include provisions for wireless terminals to make such measurements, such as the mobile assisted hand-off (MAHO) and mobile assisted channel allocation (MACA) features of the TIA IS-136 standard. It is possible for a wireless terminal 40 to be, for example, mobile units, such as cellular or PCS telephones or portable wireless modems for laptop computers or personal digital assistants (PDA's)(PDAs), or stationary units, such as wireless modems associated with desktop computers.

Page 7, line 21 (para 0029):

B8
It is possible for the base stations 5-15 to transmit test signals at respective beacon frequencies to provide the reference signals for the RSS measurements taken by the wireless terminals 40. The beacon frequencies employed by the base stations 5-15 are frequencies not used by other base stations in the vicinity, and correspondingly, provide identification of the source base stations for the test signals used for RSS measurements. In the alternative, a single beacon frequency can be employed for the test signal by the base stations which transmit the signal at respective timing intervals and in a particular sequence to indicate the identities of the respective source base stations. The use of beacon frequency signals for RSS measurements is not meant to be a limitation on the invention and other techniques can be employed to differentiate the sources of the signals to be detected by the wireless terminals 40.

Page 8, Table 1-1, line 18:

18	-91-90	-118	-92
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Page 9, line 9 (para 0034):

B9
Each row in the Tables 1-1, 1-2 and 1-3 corresponds to measurements that are substantially taken at a location in the coverage area by a respective wireless terminal 40. It is possible for the location to be a respective region of a size that is partially based on the size of the base service areas. For instance in a large outdoor system, such as a conventional cellular telephone system, the location can be as large as ten's

B9 tens of square meters, while in an indoor system, such as in an office building, a location can be as small as a quarter of a square meter.

Page 10, line 3 (para 0036):

B10 G_{term} of conventional wireless terminals are typically in the range of approximately 0 to 3 dB for onmi-directional antennas, and antenna gains for conventional cellular telephone base stations G_{base} are often on the order of 10 dB. Base station antenna gains G_{base} for smaller wireless communication systems such as indoor systems can, for example, be in the range of approximately 0 to 3 dB.

Page 10, lines 25 and 26 (para 0039):

B11 Thus, in an exemplary outdoor system with relatively high communication traffic, it is possible to take a sufficiently large number of RSS data measurements for determination of a parameter setting approximately every few minutes or hours. In contrast, in an exemplary indoor system with a limited number of users, such as less fewer than ten, it can take ~~on the order of~~ several days to obtain a sufficient number of RSS data measurements to adequately characterize the signal propagation in the coverage area to determine a parameter setting or adjustment. Further, it is advantageous to collect RSS data intermittently, whether, periodically or otherwise, during system operation to detect and adjust a parameter setting as required.

Page 11, line 35 (para 0046):

B12 For the following examples, it is assumed that the transmission power settings of the base stations 5, 10 and 15 that produced the RSS data listed in Tables 1-1, 1-2 and 1-3, ~~is~~ are 10, 10, 15 dBm, respectively, unless stated otherwise. At such transmission power settings, 17 of the 18 measurement locations in the service area of base station 5 would satisfy the RSS threshold requirement for signals transmitted by the base station 5 as indicated in column 1 of Table 1-1. The location of wireless terminal reference no. 18 would receive a signal strength of -91 dBm which is the only measured location that would fail to meet this threshold requirement. As a consequence, a coverage percentage of 94% (17/18 x100%) is achieved for the service

B12 area of base station 5 transmitting at 10 dBm. Thus, increasing the transmission power of base station 5 by one step to 15 dBm would result in the location of the wireless terminal no. 18 receiving a 5 dBm increase in signal strength to -86 dBm.

Page 12, line 33 (para 0049):

B13 Nevertheless, no change is required in the transmission power of base station 15 because the increase in transmission powers of the base stations 5 and 10 resulted in an increase in the service areas size of the base stations 5 and 10 which will cover the two locations in Table 1-3 not covered by the base station 15. In particular, the location where the wireless terminal reference no. 61 took its measurements would receive a signal strength of -86 dBm from base station 5 transmitting at 15 dBm, and the location at which the wireless terminal reference no. 62 took its measurements would also receive a signal strength of -86 dBm from base station 10 transmitting at 15 dBm. Since the relative size of the service areas provided by the respective base stations varies with transmission power, it is often desirable to use RSS measurements from a relatively greater number of locations in the coverage area than those listed in Tables 1-1, 1-2 and 1-3.

Page 15, lines 8 and 11 (para 0054):

B14 Table 3 is based on the single strengths listed in Table 2 and includes the base stations that cover the respective regions assuming a hysteresis hand-off limit of 15 dB. In Table 3, a "1" denotes that the corresponding region is covered by the particular base station and a "0" denotes that no coverage is provided to the region by the particular base station. For instance, at the location of wireless terminal reference no. 14 in Table 2, the received signal strength from base station 10 is -93 dBm which is below -85 dBm, and therefore, this base station would not cover the location of wireless terminal reference no. 14 as indicated by the "0" in Table 3. However, the received signal strengths from base stations 5 and 15 are -64 and -65 dBm, respectively, which are both above the threshold -85 dBm and within 15 dBm of one another. Thus, base stations 5 and 15 would cover the region 24 as indicated by the "1's" in Table 3.

Page 15, Table 3, lines 18-21:

B15
NE

18	<u>04</u>	0	1
19	1	1	1
20	0	<u>10</u>	<u>04</u>
21	0	<u>10</u>	<u>04</u>

Page 16, Table 3, lines 36 and 61:

B16
NE

36	0	<u>04</u>	0
61	<u>04</u>	0	0

Page 16, lines 5-7 (para 0056):

B17

The percentage of the coverage area 100 serviced by the respective base stations as well as the service area overlap between a pair of base stations can also be determined from Table 3. The coverage area percentage can be determined by the number of locations of the coverage area that are indicated as serviced by a particular base station. For instance, the number of regions serviced by the base station 5 in Table 3 is 4728. Thus, the coverage area percentage serviced by the base station 5 is 48%45% (3028 regions/62 total locations).

Page 16, lines 8-12 (para 0057):

B18

In a similar manner, the service area overlap percentage between base stations can be determined. ~~Thirteen~~Sixteen locations of the ~~3028~~ regions covered by base station 5 are covered by other base stations yielding a coverage overlap percentage of 43%57% (43/3016/28 x 100%). Likewise, the coverage overlap percentage between base stations 5 and 10 occurs at seven eight locations, which is 44%13% (7/62 8/62 x 100%) of the coverage area 100.

Page 17, Table 4:

TABLE 4

base stations	locations covered	overlap locations	Coverage area (%)	Coverage overlap (%)
5	<u>2830</u>	<u>1643</u>	<u>4548</u>	<u>5743</u>
10	<u>2726</u>	<u>1544</u>	<u>4441</u>	<u>5653</u>
15	<u>3637</u>	<u>2124</u>	<u>5859</u>	<u>5864</u>

Page 18, lines 4-8 (para 0064):

It is desirable to add a new base station to an existing wireless communication system when, for example, the average number of wireless communications in the coverage area 100 approaches or exceeds the system's call capacity. The addition of a new base station in the system would provide an increase in call capacity. The position of a new base station can be proximate to those base-station's which stations that handle relatively high call traffic. The transmission power settings of such a new base station, as well as the existing base stations, can then be determined by a method in accordance with the invention. Moreover, at such time, it would be also desirable to update the neighbor lists and isolation values for the system 1 with the added base station, as described below in Section V.

Page 20, Table 5, line 18:

18	<u>2827</u>	<u>24</u>
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Page 23, line 12 (para 0083):

An exemplary method 300 for determining an up-link C/I ratio value for a first base station is shown in FIG. 4. Referring to FIG. 4, interfering wireless terminal transmission powers in a second base station's service area are determined in step 310. Transmission power can be determined for each measurement location in the service area. It is possible for a wireless terminal to transmit at a fixed power, such as 0.6 W in conventional portable cellular telephones. However, also in conventional systems, such as those conforming to the previously mentioned TIA IS-136 standard, the wireless terminal transmission power can be controlled with control signals from the base station to which the wireless terminal is communicating. The base station controls

B22 the wireless ~~terminals~~ terminal's power in this manner such that it receives a substantially constant signal strength as the wireless terminal moves within the service area.

Page 24, lines 7 and 8 (para 0087):

B23 After the signal strengths are determined in steps 320 and 330, then, for each location in the first base station's service area, up-link C/I ratio values are computed based on interfering signals that would be generated by interfering wireless terminals from each of the locations in the second base station's service area. This computation is performed in step 340. For instance, if base station 5 that services the 18 locations for which RSS data was collected was the first base station, and base station 10 that services the 18 other locations for which RSS data was collected was the second base station, then, in step 340, 18 up-link ratio values would be determined for each of the 18 locations in the service area of base station 5 for a total of 324 (18 x 18) values. Then, in step 350, a quality measure is used to determine a single up-link base station C/I ratio or up-link isolation value for the first base station's service area based on the up-link C/I ratio value computations of step 350. The method 300 can be repeated for each base station in the communication system.